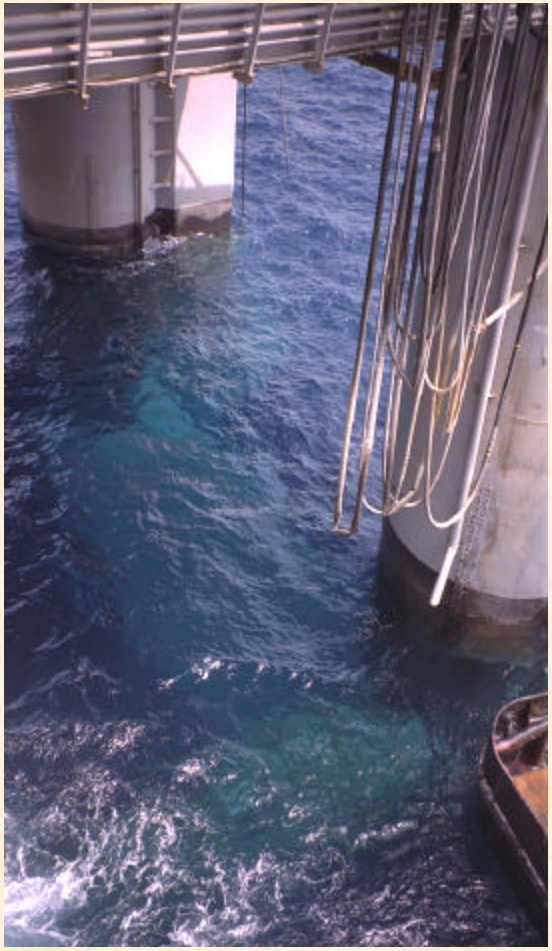
Best Practices for Produced Water Management

John Veil –
Argonne National Laboratory

Industry Partner -
Marathon Oil



Produced Water Statistics

Year of API Survey	1985	1995
Total Onshore U.S Volume (billion bbl/yr)	20	18
Injected for EOR	62%	71%
Injected for disposal	30%	21%
Discharged onshore	6%	3%
Beneficial reuse	??	2%
Other	4%	3%

Note: The API surveys did not include most offshore wastes

Costs Can Be Significant

- Costs range from a few cents to a few dollars/bbl
  - Can determine whether wells get drilled
  - Can determine how long wells continue to produce

What Is the Problem?

- Many factors determine which produced water management options are best for each location
  - Regulatory acceptability
  - Technical feasibility
  - Cost-effectiveness
- Many experienced industry employees are retiring and are being replaced by less experienced staff
  - Don’t always know the best options to select
  - May select inappropriate or overly costly

International Perspective

- Many developing countries do not have well-established produced water management requirements
- U.S. companies operating there may face limited and costly disposal options

Argonne's Solution to the Problem

- Compile information on existing produced water management technologies and practices
  - Interview producers, service companies, regulators, other consultants
  - Review literature and conference papers
- Prepare standardized set of management practices

Contents of Guidance

- Produced water characteristics
- Range of management options
- Their applicability under different circumstances
- Actual current industry practices
  - Case examples, where possible
- State and federal regulations
  - International regulations, to the extent possible
- Cost information
- Treatment requirements and technologies used prior to reuse

Argonne's Role

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- **Stand-Alone Approach**
  - Develop a consistent framework for the best practices guidance
  - Compile information on all categories
- **PERF Project Approach**
  - PERF is currently considering a joint industry project to develop a produced water management best practices guide
  - If the PERF project is begun, Argonne will prepare a detailed regulatory section and provide overall project coordination

Industry's Role

- **Stand-Alone Approach**
  - **Assist in compiling information to populate the system**
    - ⇨ **Literature searches**
    - ⇨ **Access to company data**
  - **Review materials compiled by Argonne**
- **PERF Project Approach**
  - **Provide extensive material on specific management practices**

Impact on Industry

- In U.S., operators can use the system to find the produced water management options that are most cost-effective, yet still environmentally sound
- In other countries, operators can use the system to convince governments to allow management options that may not have previously been allowed
- Cost savings leads to more capital available for new

Activities and Deliverables

FY-03

- Develop framework for guidance
- Collect information

FY-04

- Submit draft guidance and circulate for peer review
- Submit final guidance
- assist with outreach/technology transfer through presentations at conferences and publications

Funding

Source of Funds	FY03 ($K)	FY04 ($K)	Total ($K)
DOE (NGOTP)	75	75	150
Industry Partner(s)*	25+	25+	50+
Total	100+	100+	200+

*Marathon commitment; other companies may join through PERF project